

DEVELOPMENT OF THE HIGHER STATISTICS EDUCATION IN CHINA

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This paper reviews the development of higher statistics education in China. Though there has been a clear progress in the theory and direction of the development of higher statistics education in China in recent years, statistics educators' are still debating the issue of the future. They will continue their research work. This paper will then make use of related data to analyze the development of the higher statistics education in China in recent years. It concludes that although there are some problems, higher statistics education in China is developing in both theory and practice. The future of the development of higher statistics education in China will be optimistic.

INTRODUCTION

The National Bureau of Technology of China published "the Subject Classification and Code" (GB/T14745-92) in November 1992. Statistics containing all kinds of statistics in both social science and natural science belonged to the basic subject, which position is the same as that of mathematics, economics, etc. It temporarily went into the group of philosophy and humanity. The subject classification and code was put into practice on July 1, 1993. China's Ministry of Education also promulgated in 1998 a new catalogue of higher school undergraduate specialty and brief introduction of specialty. It combined Probability and Mathematical Statistics under Mathematics with Statistics originally belonging to Economics into Statistics that went into the group of Natural Science. The graduate could be given the degree of Natural Science or Economics. Thus, Statistics became a new basic subject in China, and this shows that higher statistics education in China is developing.

The practice of higher statistics education in China has made great progress after China implemented the reform and opening up policy. We will know that higher statistics education in China will face new challenges and development opportunities from understanding the experience of higher statistics education of China and analyzing the related data about it at the beginning of the new century. It is a tendency that higher statistics education in China is developing.

BACKGROUND AND REVIEW

The higher statistics education in China discussed here means the statistics education in legal higher schools in China. China introduced Mathematical Statistics at the beginning of the 20th century, and gradually became the mainstream of Statistics. The government was in great need of knowing the national social and economic state after the founding of the People's Republic of China in 1949 to make the policies and decisions. So the government introduced Statistics from the original Soviet Union to meet its needs that were suitable to the system of planning. Surely this kind of statistics education system educated a lot of students who contributed a lot to the country. However it also had a lot of problems such as only considering social-economic statistics as Statistics and excluding Mathematical Statistics as Statistics. It ruled in China for almost 40 years. Until 1992 Statistics was the second-level subject of Economics that is basic subject.

The practice of statistics in China, especially since China implemented the opening-up policy has shown that it is almost totally different between Statistics and Economics in research object, mission, method and theoretic foundation. We need to build Statistics as one basic subject and to promote the development of Statistics.

Statistics has a strong relationship with politics, economics, geography, law, administration, etc from its origin. Statistics is now a kind of general methodology science that can analyze many kinds of social and natural phenomena, while social and economic activity is one aspect of the research contents of Statistics. The method of Statistics is very useful in natural science, agriculture, medical science, engineering technique, military, humanity and social science, even in many second-level or third-level subjects of those five groups. The main contents of Statistics are theory, methodology and application, which have developed a great deal in recent

years with the development of computer science. We cannot cut apart the theory, methodology and application of Statistics which improve for each other and promote the development of Statistics together.

To put Statistics into a science group is popular in many countries nowadays. Generally speaking, Statistics stands with Mathematics, Chemistry, Physics, Biology, Computer Science and so on. In higher schools of those countries, most of Statistics Specialties are usually established for graduate students and a few are for undergraduate students. There are statistics teachers in many departments or institutes. We know that some Statistics Specialties are in the institutes of management or business, but few are in the departments of Economics where almost all the students of Economics Specialty have statistics classes.

In China today, most Statistics Specialties are established in the institutes of finance and economics. They try to cover statistics in the social and economic fields. A few Statistics Specialties that are established in universities are influenced by Mathematics. We know that Statistics is not Mathematics. After Statistics becomes the basic subject, there are still a lot of problems for us to solve in China. Those problems include how to design statistics specialties, how to train statistics teachers, how to get textbooks, how to educate students etc. We have held many seminars to discuss those problems since 1992; but both common views and different opinions still exist now. The discussions of these issues will continue. Those problems to be solved also make the higher statistics education develop in China.

The common views include primarily the position of basic subject of Statistics, the importance of Statistics, the broad application of Statistics in many fields, the characters of Statistics, etc. The different opinions include primarily the group that Statistics should belong to, the group or subject that the social and economic statistics should belong to, the content of Statistics, second-level or third-level subjects of Statistics, the relationship between Mathematic Statistics and Social and Economic Statistics, the orientation of reform of higher statistics education, etc.

It is a great project to develop the higher statistics education in China. We still need time to research, improve and reform to make Statistics progress step by step. During the period of the development of Statistics, some new ideas that meet the needs of Statistics will be included in Statistics, but some old ideas that do not meet the needs of Statistics will be excluded. This is true in the development of Statistics. It will make the higher statistics education in China develop further.

We still need to study which group Statistics should belong to. At present it is reasonable to put Statistics into the group of philosophy and humanity or science. Some people in China have different opinions with it because of the broad application of Statistics.

We still need to study the relationship between the statistical theory and practice. The theory and method of Statistics should go ahead of statistical practice, but cannot develop without the statistical practice. We need to borrow experience of other countries and combine the Chinese practice to build the structure of Statistics and to develop statistics.

We still need to study the situation of higher education to reform old structures of education in China. We need government to make some decisions about the reform of the educational system.

AN ANALYSIS OF THE HIGHER STATISTICS EDUCATION DEVELOPMENT IN CHINA

The most important characteristics in the study of the higher statistics education development in China for practice are the number of students who receive statistics education or have statistics classes in higher schools and relevant changes, and the conditions of statistics classes. We will analyze the development of higher statistics education in China according to the statistical data. We have some statistical data about the undergraduate students who are in the higher schools that have statistics specialty from the National Ministry of Education of China, and the graduate students are not included. The number of students in statistics specialty is in the columns of Statistics.

Table 1.
Relevant Students in Relevant Higher Schools

Year	Graduate		Recruit		On campus		Graduate next year	
	Total	Statistics	Total	Statistics	Total	Statistics	Total	Statistics
1996	96186	3546	115511	2622	376258	9616	102369	3038
2000	123813	2296	251805	4135	717584	12803	137598	2647

The number of total recruit students of the higher schools in China in 1996 is 966 000, the number of total recruit students of the higher schools in China in 2000 is 2206 000, from China Statistical Yearbook (2001). The number of recruit students in 2000 is 1.28 times more than that in 1996; the year average increase is close to 23%. It shows the great development of the higher education in China.

According to the table above, the number of recruit students of the higher schools which have statistical specialty in China in 2000 is 2.18 times of that in 1996, the year average increase is close to 22% which is almost the same as the level of the national average. But in those schools, the number of recruit students in statistics specialty in 2000 is only 1.58 times of that in 1996, the year average increase is close to 12%. It is 10 percentage points less than the year average increase of total recruit students in China. Though the yearly average increase of the number of recruit students in statistics specialty is less than that in many other specialties, its total increase is obvious. In addition, the number of graduate students of statistics specialty increases every year. The figures show that the future of the higher statistics education is bright. Because of the increase of the number of students of statistics specialty, it also brings the problem that there are more and more statistics classes; the statistics teachers get busier and busier to meet the demand of the statistics classes. The increase of the number of graduate students of statistics specialty also shows the rise of the level of the higher statistics education in China needs statistics teachers to meet the higher quality as a whole. All of these show that there is a great demand for statistics education, and will promote the development of the higher statistics education in China.

Recently the graduates of statistics specialty can find jobs more easily than many other graduates of non-statistics specialty. It is not only for the reason of the higher quality of the graduates of students of statistics specialty, but also for the reason of the decrease of the graduates of statistics specialty. In the early of 1990s, the graduates of statistics specialty had difficulties to find good jobs, which made the higher schools have difficulties to get more recruit students of statistics specialty. So during the middle of 1990s, the higher schools had less recruit students of statistics specialty. From the table we can see that the number of the graduates of statistics specialty decreases from 3546 to 2296, the number of the students of statistics specialty who will graduate next year decreases from 3038 to 2647, comparing 1996 to 2000. But at the end of 1990s, the situation changed. We can see that the number of the recruit students of statistics specialty increases from 2622 to 4135, the number of the students of statistics specialty who are on campus increases from 9616 to 12803, comparing 1996 to 2000. The higher statistics education for statistics specialty in China is developing again.

The above analysis also shows that more senior statisticians are needed in China. Under the high planned economic system in China before, statistics was a planning tool for the administration of the state. There was no need for marketing survey and data analysis, even a person with the level of primary school could do statistics work. But now we are in market economic system, the complexity of statistics is raised. The higher level of statistics education is needed because of the need of senior statisticians. We can expect that in the near future the graduate statistics education will surpass the undergraduate statistics education that will stop growth. This will be as the same as that of other countries. But even a negative growth of the undergraduate statistics education will not change the tendency of the development of the higher statistics education in China as a whole because of its great demand.

There are more than 60% students in the higher schools that have statistics specialty who have statistics classes according to a survey in June 2001. Some specialists of the statistics education in the higher schools with statistics specialty told us that at least there are more than 50% students in the higher schools with statistics specialty attend statistics classes. If using 50%,

at least 125900 students among the recruit students in 2000 will have statistics classes. It is a huge number comparing to 4135 students of statistics specialty. Most of those students will have 80 statistics class hours, some will have 50 hours, and some will have 100 hours. There are even more students in the higher schools without statistics specialty who need to have statistics classes, specially in the higher schools of science, technology, social science, medicine, agriculture, military, transportation, engineering, etc. The demand for statistics classes will increase with the development of the higher education in China.

In China, non-statistics specialty students who have statistics classes are very important for the application of statistics. They will make statistics become more influential and popular. So the statistics education should pay attention not only to statistics specialty but also to non-statistics specialty. This is a very important aspect of the development of higher statistics education in China.

Furthermore, though the number of graduate students of statistics specialty has already increased recently, it is still much less than that of the undergraduate students of statistics specialty. The demand of graduate students of statistics specialty in China is increasing, so the graduate student statistics education of statistics specialty will develop greatly. Thus there will be more need of the higher statistics education for the graduate students of statistics specialty. Meanwhile the demand of graduate students of non-statistics specialty for statistics class is also increasing. Those are also the factors of promoting the development of the higher statistics education in China.

In the survey of June 2001 designed to survey the condition of statistics classes for non-statistics specialty undergraduate students, we got some general results that is useful for reference. Firstly, the number of statistics teachers in different statistics departments or specialties of higher schools is different. There are about 20 teachers in most of the statistics departments, about 10 in some statistics departments, and about 30 in other statistics departments. These teachers must give lectures not only to the students of statistics specialty, but also to the students of non-statistics specialty. Sometimes a teacher has to give lectures of general statistics, economics statistics and finance statistics etc in the same term. Some teachers say that they do not have time to do research and to improve themselves. This shows the demand for developing the higher statistics education, and also shows the demand for overcoming the difficulties in the higher statistics education.

Secondly, there are different demands for statistics classes in the different higher schools to non-statistics specialty students. Those students all have classes of general statistics, many of them have other statistics classes such as finance statistics, economic statistics, or sampling survey. More than half schools use multimedia methods to give lectures to these non-statistics specialty students.

Thirdly, almost every school uses its own statistics textbooks to give lectures. The formal publishing houses publish these textbooks, so the quality of printing of the textbooks is good. Each textbook has some features of its own, but the main contents are almost the same. There are some English textbooks and translated textbooks, but few schools use them. We should study this situation and improve it.

DISCUSSION

There are a lot of achievements in the higher statistics education in China. Statistics has already become one of the basic subjects, but there are some problems to be solved. The demand for statistics is increasing. The higher statistics education in China is developing and will have a bright future.

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